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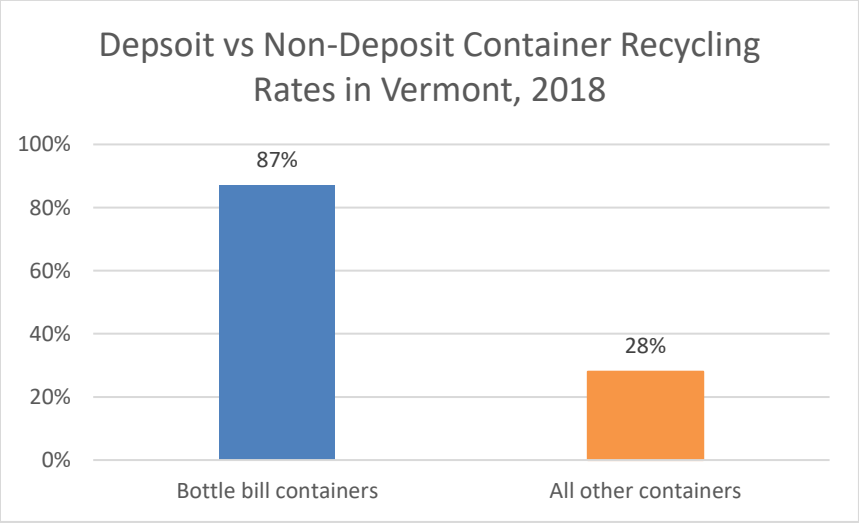
Vermont Waste Disposal Increased from 2012 to 2017; Bottle Bill Materials Recycled at 87% Rate, Compared to 28% Rate for Other "Container" Materials

Review of Reported Recycling Rates Published in 2018 Vermont Waste Characterization Study

Some testimony has been shared with the Senate Natural Resources and Energy Committee that points to a "67%" recycling rate for "containers" in the State of Vermont, as well as a "74%" recovery rate for "fiber" in the state. Both of these numbers come from Table E.2 in the report, "2018 Vermont Waste Characterization," prepared for the Vermont Department of Environmental Conservation, Solid Waste Program by DSM Environmental Services, Inc. and their subcontractors. We find, through a closer reading of the report, that both of these recycling rate calculations contain omissions of material disposed and other apparent calculation errors. After including complete disposal data and making corrections, we find that the paper/fiber recycling rate is 52%, and the container recycling rate is 47%. Furthermore, within the "container" category, the existing bottle bill materials have a recycling rate of 87%, and all other containers have a recycling rate of 28%. In addition, further analysis shows that waste disposal in the state increased between 2012 and 2017.



Here is a recreation of Table E.2, with the two notes below the table:

Table E.2. Estimated State-Wide Recyclable Materials Recovery Rate (1)

Material	Total Recyclables		
	Fiber	*Containers*	*Total*
	(tons)	(tons)	(tons)
Disposed	33,124	18,137	51,261
Recycled	92,483	36,183	128,666
Recovery Rate (%):	74%	67%	72%

(1) Includes Economic Recycling estimate as referenced on the next page.
(2) Small quantities of recyclable paper and containers are disposed in C&D and bulky waste and are excluded from Table E.6.

In the report, the text above the table says that the recyclables summarized in Table E.2 are from 3 programs:

1. From reports submitted to VT DEC by recycling facilities in Vermont (CY 2017), that is, curbside recycling that is processed by Material Recovery Facilities (MRFs) and other recycling facilities;
2. Estimates of container deposit returns (2012) (a.k.a., the "bottle bill"); and,
3. Data from the Economic Recycling Survey, which is business-to-business recycling that bypasses MRFs.

A review of Table 11 of the same report shows much higher figures for the disposal of "paper" and "containers." The report failed to reveal that the tonnages presented in Table E.2 are significantly reduced, compared to the same categories in Table 11. There is no explanation for why more than half of the "paper" disposed in the state was not included in the calculations, nor why more than a third of "containers" disposed are not included in Table E.2. The specific tonnage reductions are detailed in the following paragraphs.

Fiber Discrepancies and Recalculated Recovery Rate

Table E.2, recreated above, states that 33,124 tons of "fiber" were disposed, while Table 11 of the same report states that "paper" disposal was 83,880 tons. Paper disposal was understated by about 50,000 tons. With this correction, the calculation of the fiber recycling rate is 52%, not 74%.

Containers Discrepancies and Recalculated Recovery Rate, Plus Correcting Glass Disposal

Table E.2, recreated on the first page of this document, states that 18,137 tons of "containers" were disposed. However, the sum of all of the "container" categories in Table 11 (of the 2018 report) adds up to 28,112 tons. Therefore, about 10,000 tons of disposed containers were not included in the calculations in Table E.2. With this correction, the calculation of the container recycling rate is 56%, not 67%. In addition, in 2018, approximately 6,000 tons of glass were reported as "recycled" when in fact, that glass was disposed of at a closed landfill. When the 6,000 tons are recategorized as disposal, the "container" recycling rate is reduced to 47%.

Table 1. CRI Recalculation of "Fiber" and "Containers" Disposed and Recycling Rates

Material	Total Recyclables, with Disposal Quantities Corrected to Match Complete Data in Table 11 and with 6,000 Tons of Glass Correctly Reported as Disposed Instead of Recycled		
	Fiber	Containers	Total
	(tons)	(tons)	(tons)
Disposed	83,881	34,112	117,993
Recycled	92,483	30,183	122,666
Recovery Rate (%):	52%	47%	51%

Separating "Containers" Recycling Rate into Bottle Bill Material and Other Containers and Correctly

The summary in table E.2 combines all "container" recycling into one recycling rate. This obscures the important and dominant effect of the high recycling rate that is achieved by the state's bottle bill. We can use data from the same study to disaggregate overall "container" recycling into two components: bottle bill container recycling and all other container recycling. As shown in the table below, the recycling rate for bottle bill material is 87%, the recycling rate for all other containers is 28%, and the combined "container" recycling rate is 47%. Furthermore, the container materials recycled through single-stream curbside recycling programs typically include contamination. Taking into account contamination would reduce the 28% recycling rate even further.

Tables 11 and 12 Include Different Numbers for the Same Line Items

For example, the total of the two "PET bottle" categories in Table 11 add up to 3,212 tons. Table 12 breaks down "PET bottles" into 4 categories, and those 4 categories add up to 3,565 tons. Similarly, the two "HDPE bottle" categories add up to 1,800 tons in Table 11, and the 4 "HDPE bottle" categories in Table 12 add up to 2,004 tons. "#3-7" bottles are 431 tons in Table 11 and 478 tons in Table 12. Glass bottles are 5,742 tons in Table 11 and 6,361 tons in Table 12. Aluminum cans are 2,532 tons in Table 11 and 2,807 tons in Table 12.

What is the pattern between these two Tables? All of the tonnage subtotals in Table 12 are 11% higher than the tonnage subtotals in Table 11. Since the tonnage subtotals in Table 11 tie to the total amount of waste disposed in the state, 422,258 tons, we assume that Table 11 is correct and Table 12 is incorrect, and further conclude that all of the figures in Table 12 are consistently overestimated by 11%. That is, the data used to calculate the bottle bill recycling rate overstates disposal of bottle bill materials by 11%.

Therefore, we added up the subcategories for bottle bill materials disposed, and the total was 3,069 tons. We then divided by 1.11, in order to remove the effect of the 11% overstatement, and the result was 2,765 tons.

Table 2. Disaggregating Container Recycling into Bottle Bill Recycling and all Other Container Recycling (Using CRI's Revised Calculations of Fiber and Containers)

Material	Container Portion of Table E.2, Disaggregated, 6,000 Glass tons Moved to "Disposed" from "Recycling" and Adjustment of Overstated Bottle Bill Material Disposed		
	Bottle Bill Materials	All Other Container Recycling	Total Containers
	(tons)	(tons)	(tons)
Disposed	2,765	31,347	34,112
Recycled	18,096	12,087	30,183
Recovery Rate (%):	87%	28%	47%

Overestimate of Residential Waste in 2012 Study Leads to Inaccurate Statements of "Reductions" in 2018 Study

The 2018 study notes that an assumption was made in 2012 that was subsequently found to be erroneous. The explanation is on page 5, *"It should be noted that the allocation of 39 percent residential and 37 percent ICI MSW is significantly different from the 60 percent residential and 40 percent ICI MSW allocation used in the 2012 waste characterization report…..For this reason, it is not recommended that readers of this report compare tonnages by material type, instead the comparison should be based on the percent composition between the two reports."*

Explained in more concrete terms, the total size of the residential waste stream was overestimated in the 2012 study by 54%. The allocation error affected all of the percentages in the waste composition study in 2012, as well as many of the tonnage figures that were presented for subcategories that depended on the allocation percentage. Therefore, statements in the 2018 report like, "the estimated decrease in tons of [residential] recyclable paper disposed between 2012 and 2017 is significant" (p. ES-6) and "…less residential MSW being disposed overall (by weight, in 2017)"(p. ES-7) should be reevaluated to see if these statements were made using the *uncorrected* or the *corrected* tonnage values for 2012 disposal.

Overall Waste Disposal INCREASED from 2012 to 2018

There is one significant finding from the 2018 report that was not emphasized enough: the total disposal in the state increased from 413,517 tons in 2012, to 422,258 tons in 2017. On a percentage basis, the increase is only 2%, but the goal of the state's waste recycling and

reduction programs is to increase recycling and source reduction and decrease disposal. Over the 5-year period from 2012 to 2017, waste disposal increased. **Clearly, much more significant additional recycling and waste reduction programs are needed to reduce waste to landfills in Vermont.**